

America to an essentially northern range (Quebec to Connecticut and westward), and the wide-spread occurrence of the open-panicked form (Quebec and Nova Scotia to Oregon, Florida, Texas and California) would seem to indicate a response to the length of the growing period. Thus, Professor Fernald states,¹ "This form [*forma inclusa*] seems to be more common in Nova Scotia than the typical form of the species with exserted panicles." Also, the general lateness of the dates of collection of the specimens cited above serves to suggest that in some cases the clandestine habit may be associated with secondary flowering.

GRAY HERBARIUM.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY.—NO. LXXIX.

(Continued from page 78.)

5. *P. SPECUICOLA* Rydb. *Leaves* spatulate, rounded at summit, narrowed to a subpetiolar base, *membranaceous, sinuate-dentate*, 4–13 cm. long, 0.7–2 cm. broad, farinose to efarinose beneath: *scape* 1–1.6 dm. high, 1.5–2 mm. in diameter, *efarinose: involucral bracts* lance-attenuate or -involute, 4–10 mm. long, *dorsally thickened but scarcely gibbous at base*: umbel 6–12-flowered: pedicels strongly ascending, in anthesis 0.5–1 cm., in fruit sometimes elongating to 4 cm. long: *calyx farinose*, campanulate, *becoming turbinate*, in maturity 6–9 mm. long and 3 mm. in diameter; the *lance-attenuate to -subulate lobes* about equaling the tube: *corolla-tube* yellowish, 8–10 mm. long, its *violet limb* 6–10 mm. broad, with the narrowly cuneate lobes emarginate: stamens inserted near the middle of the tube; the anthers and stigma not exserted; *capsule much overtopped by the calyx-lobes*: seeds angulate, 0.4–0.6 mm. long, fulvous, muriculate.—Bull. Torr. Bot. Cl. xl. 461 (1913). *P. farinosa* Eastwood, Proc. Cal. Acad. ser. 2, vi. 304 (1897).—Southeastern UTAH: moist bench of cliffs near Bluff City, *Eastwood*, no. 68; Moab, June 7, 1913, *M. E. Jones*. Rydberg's type was from "loose soil, under overhanging cliffs in the alcove-like heads of the canyons, characteristic of the limestone bluffs of San Juan River," near Bluffs.

P. specuicola differs from *P. farinosa* and from all other American species which have been called *P. farinosa* in the very sharp calyx-lobes, long corolla-tube and short capsule. I have seen no good flowers but Rydberg's description of the corolla-limb as "dark

¹ RHODORA 23: 229. 1921.

violet" and Miss Eastwood's characterization of it as "crimson," suggest much deeper coloring than in the other *Farinosae*. Neither of these authors mentions a yellow eye such as occurs in most of the species. The long corolla-tube, deep color of the limb, shape of fruiting calyx, scarcely gibbous bracts, and thin sinuate-dentate leaves suggest that *P. specuicola* may be nearer related to *P. Rusbyi* Greene than to the *Farinosae*; but *P. Rusbyi* has much larger flowers, the leaves with cartilaginous or callous teeth and the caudex bearing marcescent brown sheaths.

6. *P. intercedens*, nom. nov. *Leaves yellow-farinose beneath*, sometimes green, *firm*, obovate, spatulate or oblanceolate, 1–7 cm. long, cuneate at base but scarcely petioled, crenate-dentate or subentire, with the margin commonly revolute: scape 0.4–2.5 dm. high, filiform to stoutish, 0.5–1.8 mm. in diameter and sometimes slightly farinose at summit: *bracts of the involucre* lance-attenuate, involute or subulate at tip, 3–6 mm. long, slightly dilated and thickened but *scarcely gibbous at base*: umbel 1–10-flowered: the stiffly fastigate filiform pedicels at first only 1–10 mm. long, in fruit lengthening to 0.6–3 cm.: *calyx* turbinate-campanulate, *commonly farinose*, in anthesis 3.5–4 mm. long, *in fruit* 4–6 mm. long, cleft nearly to the middle into lanceolate to narrowly ovate acute to obtuse lobes: *corolla* lilac; the slender tube slightly exserted: the *limb* 1–1.5 cm. broad; its obovate or cuneate deeply obcordate lobes 4–7 mm. broad; *stigma or tops of anthers slightly exserted* from the yellow throat, at least of shrivelled corollas: *capsule* cylindrical, once-and-a-half the length of the calyx, 2–3 mm. in diameter; its valves splitting into linear halves 0.5–1 mm. wide: *seeds angulate and truncated, strongly rugose or reticulated*, 0.5–0.7 mm. long.—*P. farinosa* Nutt. Gen. i. 119 (1818); Torr. Am. Journ. Sci. iv. 59 (1822); not L. (1753). *P. farinosa*, β . *americana* Torr. Fl. No. Mid. U.S. i. 213 (1824), excluding syn. *P. pusilla* Goldie; Fernald, RHODORA, ix. 16 (1907); not *P. americana* Rydb. (1901). *P. pusilla* Hook. Bot. Mag. lvii. t. 3020 (1830), not Goldie (1822).—Shores of the upper Great Lakes, southwestern Ontario, northern Michigan and northeastern Minnesota; also Lake Nipigon. ONTARIO: Johnstone's Harbor, Lake Huron, August 22, 1901, *J. Macoun*, no. 54,260; shore of Lake Superior, July 16, 1867, *J. Macoun* (Can.); dampish places, Lake Nipigon, July 15, 1884, *J. Macoun*, no. 15,846, in part (Can.). MICHIGAN: Isle Royale, August 2, 1865, *A. H. & C. E. Smith* (Penn.); wet rocks, Isle Royale, July, 1889, *Sandberg*, (Minn.); north shore of Thunder Bay, Lake Huron, Alpena Co., July 3, 1895, *C. F. Wheeler*; shore of Thunder Bay near Alpena, July 5, 1895, *C. F. Wheeler*; on and near Lake Huron beach, in damp sand, near Alpena, June 24, 1912, *C. K. Dodge*, no. 3; open pasture near cedars and near shore of Straits of Mackinac, St. Ignace, May 14, 1914, *W. H. Manning*; Keweenaw Peninsula, *Robbins*. MINNESOTA: Two Harbors, Lake

Co., June, 1891, *Sandberg* (Minn.), June 1891, *E. P. Sheldon*, no. 4400; damp basic eruptive rocks, Susie Island, Cook Co., September, 1927, *Butters* (Minn.); Agate Bay, *L. H. Bailey*, no. 477 (Minn.); Grand Marais, Cook Co., August 4, 1875, *T. S. Roberts* (Minn.), August 17, 1906, *H. L. Lyon*, no. 924 (Minn.).

Nuttall's *P. farinosa* was from "calcareous gravelly shores of the islands of Lake Huron; around Michilimakinak, Bois Blanc, and St. Helena, in the outlet of Lake Michigan: abundant." Torrey's *P. farinosa*, β . *americana*, described in detail by him, came from "shores of Lake Huron, Lake Michigan, &c. *Douglass and Nuttall*." It is the plant of upper Michigan and the adjacent region of Ontario and Minnesota which has passed as *P. farinosa*. Unlike true *P. farinosa*, *P. intercedens* has the involucre bracts without basal auricles, the umbels few-flowered (in *P. farinosa* often with 20–25 flowers), the tube of the fruiting calyx only obscurely (in *P. farinosa* strongly) nerved, and the anthers borne higher on the tube, near the throat and slightly protruding from the shrivelled corolla. In the latter character and in the protruding of the style in the long-styled form *P. intercedens* is closer to *P. mistassinica* than to *P. farinosa*, *P. stricta*, *P. laurentiana* and *P. incana*; but it has the strongly angled and conspicuously rugose seeds as in these species, in this important character as well as in the ordinarily heavy development of wax on most of the leaves at once departing from typical *P. mistassinica*.

In perfectly characteristic fruiting material *P. intercedens* seems to stand quite apart, but as yet I have been unable to find floral differences; and, in view of the fact that *P. mistassinica*, with its rounded and less rugose seeds, may be sometimes farinose, the difficulty is increased. *P. intercedens* is here proposed without full confidence of its specific value; but it seems most likely that, in the upper Great Lake region, where it occurs in the same areas as typical *P. mistassinica*, the two have become much crossed. Elsewhere across the continent, from Newfoundland to Yukon and British Columbia, *P. mistassinica* is very constant in its seed-characters. It does not seem probable, then, that *P. intercedens* (*P. farinosa*, β . *americana* Torr.) is to be considered a variation of *P. mistassinica* in which the seeds have taken on (or retained) the characteristics of the coarser *P. stricta*, *P. laurentiana* and *P. incana*. The true status of the plant can be worked out only by the botanists of the upper Great Lake region.

7. *P. AJANENSIS* E. Busch. *Leaves densely yellow-farinose* beneath, obovate or rhombic-spatulate, 0.6–2 cm. long, 0.5–1.1 cm. broad, narrowed to a *winged or broad and short petiole*; the blade *dentate*: scape slender, 0.3–1 dm. high, farinose at summit: *involucral bracts subulate-lanceolate*, 3–5 mm. long, gradually dilated and thickened but *hardly saccate at base*: umbel 2–12-flowered: *pedicels* filiform, *farinose*, 5–10 mm. long, in fruit sometimes up to 2 or 3 cm. long: calyx campanulate, in maturity 4–6 mm. long and about 3 mm. in diameter, cleft about half its length into lanceolate to oblong lobes: *corolla* violet; the tube only slightly exceeding the calyx; the *limb 1–1.2 cm. broad*, with obovate lobes about 5 mm. broad: stigma or summits of anthers slightly exserted from the throat: capsule cylindrical, about twice the length of the calyx, 2.5 mm. in diameter: seeds not seen.—Fl. Sib. et Orient. Extr. iv. Cem. 65: 34 (1926).—Eastern Siberia and Alaska. ALASKA: dampish moorlands, Nunivak Island, August 8, 1891, J. M. Macoun, as *P. stricta* or *P. borealis*.

Primula ajanensis was based on material from Ochotsk Province in eastern Siberia, but Mrs. Busch's clear description and beautiful illustration of it show it to be the plant twice collected by J. M. Macoun on the cruise of the British Bering Sea Commission, once on Nunivak Island (above cited) and later at Plover Bay, Siberia (distributed as *P. borealis*).

8. *P. MISTASSINICA* Michx. *Leaves efarinose* or rarely a little farinose, oblanceolate, spatulate or cuneate-obovate, sessile or narrowed to short winged petioles, 0.5–7 cm. long, 0.2–1.6 cm. broad, *many of the blades dentate from near or from below the middle*: scape filiform or stouter, 0.3–1.4 mm. in diameter at summit, *efarinose* or but slightly farinose, 0.3–2.1 dm. high: *bracts of the involucre linear-subulate*, 2–6 mm. long, broadened and thickened but *commonly not saccate at base*: umbel 1–10-flowered: *pedicels* filiform, 0.2–0.5 mm. in diameter, much exceeding the bracts, in maturity 0.5–3.5 cm. long: *calyx slenderly campanulate*, 3–6 mm. long, 2–3.5 mm. in diameter, *efarinose* or rarely farinose, cleft to the middle into lanceolate, oblong or narrowly ovate obtuse to acute lobes: corolla-tube yellow, exserted; the pale-pink, lilac or bluish-purple (or white in forma *LEUCANTHA*) limb 0.8–2 cm. broad, its obovate or cuneate-obcordate or emarginate lobes 3–6 mm. broad; eye orange or yellow (except in var. *NOVEBORACENSIS*): *stigma or tops of anthers protruding* from the throat of the shrivelled corolla: *capsule subcylindric*, once-and-a-half to twice as long as the calyx, 2–3 mm. in diameter; its valves splitting into linear halves 0.5–0.9 mm. wide: *seeds* 0.4–0.6 mm. long, rounded, nearly smooth or obscurely linear-reticulated.

A very variable species, with three strongly marked variations

Limb of corolla 0.8–2 cm. broad, with conspicuous orange or yellow eye.

Corolla-limb pink, lilac or bluish-purple *Var. typica.*

Corolla white *Forma leucantha.*

Limb of corolla 0.8–1 cm. broad, without conspicuous yellow eye.

Var. noveboracensis.

Var. *typica.* *P. mistassinica* Michx. Fl. Bor.-Am. i. 124 (1803); Lehm. Monogr. Prim. 63, t. 7 (1817); Hook. Bot. Mag. lvii. t. 2973 (1830); DUBY in DC. Prodr. viii. 43 (1844); Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878) in part. *P. pusilla* Goldie, Edinb. Phil. Journ. vi. 322, t. 11, fig. 2 (1822). *P. Hornemanniana* Hook. Fl. Bor.-Am. ii. 120 (1838), in part, not Lehm. (1817). *P. farinosa*, var. *mistassinica* (Michx.) Pax, Engler's Bot. Jahrb. x. 200 (1889) in part. *P. farinosa*, subsp. *mistassinica* (Michx.) Pax & Knuth in Engler, Pflanzenr. iv²³⁷. 85 (1905), in large part. *P. sibirica*, var. *mistassinica* (Michx.) Kurtz, Engler's Bot. Jahrb. xix. 396 (1894). *P. Maccalliana* Wiegand, Bull. Torr. Bot. Cl. xxvii. 389 (1900); Brown & Schaefer, Alp. Fl. Can. Rocky Mts. 227, t. lxiii. (1907); Rydb. Fl. Rocky Mts. 647 (1917).—Southern Labrador and Newfoundland to southern Yukon, south to central Maine, northern Vermont, northern Michigan, northern Wisconsin, northern Minnesota, southern Alberta and southern British Columbia. The following, selected from about 150 numbers, are representative. LABRADOR: grassy banks, Lake Michikamau, Hamilton River, *A. P. Low*, no. 6035 (Can.). NEWFOUNDLAND: bare wet peat and depressions in limy bog-barrens, Rock Marsh, Flower Cove, *Fernald, Long & Dunbar*, no. 26,958; peaty and turfey pockets in limestone barrens, Brig Bay, *Fernald, Long & Dunbar*, no. 26,959; borders of ponds on the limestone tableland, Table Mt., Port-à-Port Bay, *Fernald & St. John*, no. 10,860; by Grand Codroy River, July 10, 1912, *J. R. Lunt*. QUEBEC: Eskimo Point, June, 1909, *C. W. Townsend*, *St. John*, no. 90,676 (Can.); Anticosti, June 20, 1861, *Hyatt, Shaler & Verrill*; sur les talus calcaires, Rivière Vaureal, Anticosti, *Victorin, Rolland & Louis-Marie*, no. 21,831; rivage du Lac Salé, Anticosti, *Victorin & Rolland*, no. 25,107; by springs, calcareous summit and northerly slopes of Percé Mt., Percé, *Fernald & Collins*, no. 1145; endroits sourceux, au pied de Montagne Sainte-Anne, Percé, *Victorin, Rolland, Brunel & Rousseau*, no. 17,645; calcareous cliffs, facing north, alt. 900–1125 m., Table-top Mts., *Fernald & Collins*, nos. 707, 708; calcareous slaty cliffs, alt. 300 m., Lac Pleureuse, *Fernald, Dodge & Smith*, no. 25,983; moist rocks and turfey chimneys, alt. 800–1050 m., Pease Basin, between Mts. Logan and Pembroke, *Pease & Smith*, no. 25,982; wet red-sandstone bluffs along Bonaventure River, August, 1904, *Collins, Fernald & Pease* (with stolon nearly 1 dm. long!); wet ledges by Escuminac Brook, Grand Cascapedia River, July 12–15, 1905, *Williams, Collins & Fernald*; Rivière des Goelands, *Michaux*, TYPE in herb. Mus. d'Hist. Nat. Paris ("ad lacus *Mistassins* Canadam inter et fretum *Hudsonis*"—Michx. Fl. Bor.-Am. i. 124);¹ about

¹ Michaux's label reads definitely "Rivière des Goelands," not Lake Mistassini and his *Journal* does not enumerate it from Lake Mistassini. Rivière des Goelands was

Quebec, May 21, 1863, ex herb. *Univ. Laval*; rochers humides, Ile d'Orleans, *Victorin*, no. 16,122. NEW BRUNSWICK: moist ground, Connor, Madawaska, *Pease*, no. 2248; Grand Falls, *Malte & Watson*, no. 118,333 (Can.); crevices of calcareous rock, Gorge of Aroostook River, July 17, 1902, *Williams, Collins & Fernald*; wet rocks, Woodstock, *J. Macoun*, no. 22,545 (Can.); Kennebecasis River, July, 1880, *Hay*; rocky shore of St. John River, near mouth, 1884, *Hay*. NOVA SCOTIA: wet boggy banks, Truro, *J. Macoun*, no. 15,841 (Can.); Upper Stewiacke, *Miss A. L. Archibald*, no. 69,371 (Can.). MAINE: gravelly shores, St. Francis, *Fernald*, no. 2427; seepy gravelly shores, Fort Kent, *Fernald*, no. 2428; ledgy banks of Aroostook River, Masardis, September 8, 1897, *Fernald*; sandy river bank, Fort Fairfield, *Fernald*, no. 82; Houlton, 1881, *Kate Furbish*; limestone rocks, banks of Piscataquis River, Sangerville, *Chamberlain*, no. 298; banks of Piscataquis River, Foxcroft, May 12, 1894, *Mary L. Fernald*; crevices of ledges along river, Dover, May 12, 1895, May 21, 1896, *G. B. Fernald*; springy limy gravel beach, Township ix, Range 17, Somerset Co., *St. John & Nichols*, no. 2444. VERMONT: wet calcareous cliffs, Willoughby Mountain, *Pringle et al*; rocky ledges, Mt. Annance, Willoughby Lake, September 20, 1855, *Wm. Boott*; roadside, Willoughby, June 12, 1896, May 21, 1905, *Kennedy*; 4th of July Slide, Willoughby, June 12, 1905, *Kennedy*; bog near Willoughby Lake, June 1, 1909, *Churchill*. ONTARIO: Lake Nipigon, *J. Macoun*, no. 15,846 in part (Can.); Pic River, Lake Superior, *Loring*; ledges by Lake Superior, Agawa Bay, *Pease*, no. 17,971; calcareous rock, Current River Falls, Port Arthur, *Williamson*, no. 2888 (Penn.); mouth of Albany River, James Bay, *Spreadborough*, no. 62,556 (Can.). MICHIGAN: Marquette Island, Les Chanaux Islands, August 27, 1913, *W. H. Manning*; Isle Royale, August 2, 1865, *A. H. & C. E. Smith* (Penn.), *Cooper*, no. 55; Presque Isle, *Houghton*; rocky shore, Delta

the name used by Michaux for a large river emptying from Lake Mistassini into Hudson Bay. "Le 4 Septemb. [1792] . . . A 10^h $\frac{1}{4}$ entré dans le Lac Mistassin. . . . Le 5 fait environ 8 à 10 lieues et diné sur la rive des Goelands à 16 lieues de distance du Lac. . . . Le soir campé . . . 22 lieues en totalité. Campé pres la rivière Atchouke. (Riv. des Loup-marins)"—*Journ. André Michaux*, ed. Sargent. 81, 82 (1889). L'Abbé Ovide Brunet gave this account: "Having made his collections, and reached the other side of the lake, Michaux proceeded on his journey; choosing for this purpose, among the discharges of the lake, a large and fine river falling into Hudson's Bay, and known as the Rivière des Goëlans (Gull River), which is very probably that designated in the maps as Rupert's River. He followed this for some distance, and camped on the night of September 5th, near the Atchoukue or Seal River. . . . Along the banks of the Gull River the following plants were collected:—*Xylosteum villosum*, Michx.; *Primula Mistassinica*, Michx." etc.—*Brunet, Michaux and his Journey in Canada*, Can. Nat. ser. 2, i. 336, 337 (1864).

From this evidence it might be inferred that *Primula mistassinica* was not seen by Michaux on the shores of Lake Mistassini; but in the report of his collections from Lake Mistassini, Rupert River and Rupert House, *Geol. and Nat. Hist. Surv. Can. n.s. i. 36-44D* (1886) the late J. M. Macoun recorded it only from the Lake not from Rupert River, and he subsequently recorded it as "One of the commonest plants at Lake Mistassini"—*Macoun, Cat. Can. Pl. i. 564* (1886). The organized portion of the National Herbarium at Ottawa shows, however, no material from Lake Mistassini.

County, August 17, 1901, *M. A. Barber*. WISCONSIN: sand beach near Rowley's Bay, Door County, *Pease*, no. 18,003; moist ledges by St. Croix River, St. Croix Co., *Rosendahl*, no. 4238 (Minn.). MINNESOTA: Encampment, Lake Co., *Sheldon*, no. 4768 (Minn.); moist rocks, Grand Marais, *Rosendahl & Butters*, no. 4643 (Minn.); Two Harbors, *Sandberg* (Minn.); Knife River, *Sheldon*, no. 4948 (Minn.). MANITOBA: Mile 256, Hudson Bay Ry., July 12, 1917, *J. H. Emerton*; Clearwater Lake, July 2, 1917, *J. H. Emerton*; Sewell, *J. Macoun*, no. 12,726 (Can.). SASKATCHEWAN: without locality, 1857-8, *Bourgeau*; north side of Lake Athabasca, *J. W. Tyrrell*, no. 15,840 (Can.). MACKENZIE: Mackenzie River, *Richardson*; west shore of Great Bear Lake, *J. M. Bell*, no. 22,956 (Can.); southwest and north shore of Great Slave Lake, *C. F. Howe*, no. 1019 (Can.). ALBERTA: Red Deer River, *J. Macoun*, no. 15,842 (Can.); Rocky Mountains, *Drummond, Burke*; Junction of North Fork and North Branch of Saskatchewan, *S. Brown*, no. 919; Bear Creek Camp No. 1, *S. Brown* no. 900; Pipestone Creek, *J. Macoun*, no. 68,725; vicinity of Basin, Banff, *S. Brown*, no. 13; moist ground, Banff, alt. 4900 ft., *Butters & Rosendahl*, no. 1327, June 4, 1904, *E. M. Farr* (Penn.); Devil's Head Lake, *Sanson*, no. 22,140 (Can.); Laggan, *J. Macoun*, no. 68,723 (Can.). BRITISH COLUMBIA: near Field, June, 1896, *C. E. Cummings*; river flats, Yoho Valley, alt. 5000 ft., *Butters & Rosendahl*, no. 1434; Torrent Fan, Emerald Lake, *Heacock*, no. 14; Six-Mile Creek, May 18, 1905, *Edith M. Farr* (Penn.). YUKON: Frances River, lat. 61°, *Dawson*, no. 15,844 (Can.).

Forma *LEUCANTHA* Fernald, *RHODORA*, xxi. 148 (1919).—With the typical form, often more abundant. NEWFOUNDLAND: Glenwood, *Fernald & Wiegand*, no. 6072; Grand Falls, *Fernald, Wiegand, Bartram & Darlington*, no. 6070; Millerton Junction, *Fernald & Wiegand*, no. 6071; Grand Lake, 1906, *Owen Bryant*; Savage Cove, *Fernald, Wiegand, Pease, Long, Gilbert & Hotchkiss*, no. 28,891; Flower Cove, *Pease, Long & Gilbert*, no. 28,890; Middle Arm, Bay of Islands, *Waghorne*, no. 5; near Frenchman's Cove, Bay of Islands, *Mackenzie & Griscom*, no. 10,405; Birchy Cove (Curling), *Fernald & Wiegand*, no. 3881; Table Mountain, Port-à-Port Bay, *Fernald & St. John*, no. 10,861. QUEBEC: Eskimo Point, Saguenay Co., June, 1909, *C. W. Townsend*; Percé, *J. M. Macoun*, no. 68,948. VERMONT: Willoughby, May 24, 1904, *Kennedy*.

Var. *noveboracensis*, var. nov., foliis obovatis vel late oblanceolatis; corollae limbo 0.8-1 cm. lato, fauce vix flava.—*P. mistassinica* Torr. Fl. N. Y. ii. 7 (1843); Paine, N. Y. State Cat. 18th Ann. Rep. 105 (1865); Clinton, N. Y. State Mus. 24th Rep. 101 (1872); Prentiss, Bull. Torr. Bot. Cl. iv. 15 (1873); Dudley, Cayuga Fl. 60 (1886); Rowlee, Bull. Torr. Bot. Cl. xx. 69 (1893); Peck, N. Y. State Mus. 46th Rep. 48 (1893); House, Wild Fl. N. Y. ii. 211, t. 159B (1918); House, Annot. List Ferns and Fl. Pl. N. Y. 588 (1924); Wiegand & Eames, Fl. Cayuga L. Basin, 338 (1926); not Michx.—Cold or wet

cliffs and ravines northwestern and central New York, southern Ontario, southern Michigan and northern Illinois. NEW YORK: "Penn Yan," Sartwell (acc. to House "the specimen in the Sartwell herbarium is labelled 'Hammondsport'"); Annsville, Taberg, June, 1846, Knieskern & Vasey; Taberg, Paine; wet rocks, Taberg, May 23, 1920, House, no. 6911 (Can.); cliffs of Fish Creek, Oneida Co., 1864, Paine; Crooked Lake, Sartwell; dripping cliff, south side of ravine near Triphammer Falls, Fall Creek, Ithaca, May 27, 1915, A. J. Eames, no. 4804 (TYPE in Gray Herb.); wet limy cliffs, Taughannock Ravine and vicinity, Ulysses, MacDaniels, no. 3020; other stations cited in Portage and on Salmon River, Oswego Co. ONTARIO: Galt, May 31, 1907, J. Macoun, no. 88,032 (Can.). MICHIGAN: Clifton, June, 1883, F. E. Wood; rocks, Grand Ledge, 10 miles west of State College, May 3, 1890, C. F. Wheeler; face of wet rocks in moss, bank of Grand River, 10 miles west of State College, May 10, 1890, C. F. Wheeler. ILLINOIS: limestone cliffs, Jo Davies County, June 15, 1891, H. S. Pepon (Minn.).

Var. *noveboracensis* has smaller flowers than most of the more northern and typical *P. mistassinica*, but occasional northern plants have them as small. In its lack of a well marked orange eye it is most striking, true *P. mistassinica* having the throat bordered by a brilliant yellow or orange ring (as in most of the § *Farinosae*). The leaves of var. *noveboracensis* are somewhat distinctive but similar foliage occasionally occurs in the more northern type with larger corolla and yellow eye.

I have sought in vain for any character upon which to separate *P. Maccalliana* from *P. mistassinica*, but can find absolutely nothing to separate it from the variable plant of eastern Canada, northern New England and Newfoundland. In describing it, Wiegand said: "From the eastern *P. Mistassinica* it differs quite markedly in its stouter habit, broader and more farinose leaves, short-pedicelled flowers, larger acute-lobed calyx, and large bluish, not pink or flesh-colored, corolla with tube scarcely longer than the calyx, and with a very prominent yellow eye." In interpreting the description of *P. Maccalliana* it should be borne in mind that Wiegand knew as *P. mistassinica* the var. *noveboracensis*, which is a very small extreme without "prominent yellow eye." As for the other characters, an abundant series of specimens shows that *P. mistassinica* may have in the same general region either obtuse or acute or even attenuate calyx-lobes, the leaves efarinose or slightly farinose, dentate or entire, and the pedicels and corolla-tube very variable in length. The blue color emphasized by Wiegand is not a constant character.

Professor Butters, who has collected the plant at Banff and elsewhere in the Canadian Rockies, assures me that the fresh flowers are pink or lilac-purple and that he has never seen any decided blue in them except as a post-mortem character in dried specimens. The late Stewardson Brown, who also knew *P. Maccalliana* in the field, says, "Flowers . . . pale pink or bluish" and Mrs. Schäffer's photograph of it looks quite like eastern *P. mistassinica*. In this connection it is not inappropriate to quote the description by the late John A. Paine of the station of *P. mistassinica*, var. *noveboracensis* on Fish Creek, Oneida Co., New York:—

"Near dripping water the plants grow most abundantly and largest, often eight or ten inches in height, and bearing a cluster of as many flowers. These vary in color, from pure white, through different shades of pink, to deep blue. The leaves also vary in form, from round obovate to oblong lanceolate; often entire, commonly more or less toothed; usually smooth beneath, but frequently white mealy. A whole cliff-side scattered over with these variegated Primroses is one of the loveliest sights in all our flora."¹

If *P. Maccalliana*, originally separated from the plant of New York by "bluish, not pink or flesh-colored, corolla" may have, as described by those who know it in the field, "Flowers . . . pale pink" and if the New York plant may have them "from pure white, through different shades of pink, to deep blue," it is obvious that color of the corolla in these cases is no safer as a specific criterion than it is in most other plants! *P. Maccalliana* more often has the leaves entire or subentire and slightly farinose, but plenty of western specimens have the nonfarinose leaves copiously dentate. Conversely, many eastern plants have some or all of the leaves subentire to entire and occasionally eastern plants show them more strongly farinose than any from the Rocky Mountains.

9. *P. PARVIFOLIA* Duby. *Leaves efarinose, cuneate-obovate, spatulate or rhombic, 0.4–3 cm. long, 1.5–7 mm. broad, the lower scarcely petioled, the upper with winged petioles, the margin denticulate: scape filiform, 0.4–1.8 dm. high, efarinose: bracts of involucre lance- or linear-subulate, 2–5 mm. long, dilated and thickened but not saccate at base: umbel 2–9-flowered: pedicels filiform, 6–15 mm. long: calyx campanulate, efarinose, somewhat gibbous at base, 3–5 mm. long, cleft half-way into lanceolate lobes: corolla lilac; the tube rarely exerted; the limb 7–10 mm. broad, with the emarginate or obcordate cuneate lobes 1.5–3 mm. broad: stigma or summits of anthers exerted: capsule*

¹ Paine, N. Y. State Cat. 18th Ann. Rep. 105—Reprint, 53 (1865).

cylindrical, up to once-and-a-half the length of the calyx, 2 mm. in diameter: seeds rounded-obovoid, smooth, about 0.5 mm. long.—Duby in DC. Prodr. viii. 42 (1844). *P. mistassinica* Cham. & Schlechtd. Linnaea, i. 213 (1826), in large part; Eastwood, Bot. Gaz. xxxiii. 212 (1902); not Michx. (1803). *P. tenuis* Small, Bull. Torr. Bot. Cl. xxv. 320 (1898). *P. borealis*, var. *parvifolia* (Duby) Pax in Engler & Prantl, Pflanzenr. iv²³⁷. 81 (1905). *P. Chamissonis* E. Busch, Fl. Sib. et Orient. Extr. iv. Cem. 65: 28 (1926).—Alaska and adjacent Siberia. ALASKA: several stations cited by Chamisso & Schlechtendal and by Mrs. Busch; Cape Nome, 1900, *Blaisdell*, no. 129, as *P. mistassinica*.

Duby's *P. parvifolia*, described "ad fretum Beering (Fisch.! in herb. cl. Kunth)", is treated by Pax as a small-leaved variety of *P. borealis* Duby; while Mrs. Busch, in her remarkably exhaustive treatment of the Siberian *Primulaceae*, makes no mention of it, even as a synonym. In view of the reduction by Pax of the wholly distinct *P. Loczii* Kanitz of central Asia to *P. borealis* (see discussion under the latter) it need not be surprising that Pax should also include in *P. borealis* the very distinct *P. parvifolia*. Surely, Duby, who published both *P. parvifolia* and *P. borealis*, was too discerning a specialist to separate them if they differ only by a millimeter or two in the length of the leaves and by the slightly different outline of the latter. Duby indicated other differences, notably: in *P. parvifolia* "corollae lobis emarginatis," in *P. borealis* "corollae . . . lobis obcordatis semi-bifidis." The plant of the Bering Straits region and Alaska, described in detail and beautifully illustrated by Mrs. Busch as *P. Chamissonis*, well matches the description of Duby as does the *Blaisdell* material from Cape Nome. Should it eventually prove that I am in error in identifying these with *P. parvifolia*, the name *P. tenuis* Small (1898) should be used for the plant here described.

10. *P. BOREALIS* Duby. *Leaves* efarinose or only sparingly farinose, *cuneate-obovate* or *rhombic-spatulate*, 0.6–4 cm. long, 1.5–10 mm. broad, mostly with *petioles longer than the dentate blade*: *scape* filiform, efarinose, 2.5–10 cm. high: *bracts of involucre* lance-subulate, often unguiculate, 2–6 mm. long, dilated and *usually slightly saccate-gibbous at base*: *umbel* 1–12-flowered: *pedicels* filiform, 0.2–1.4 cm. long: *calyx* *turbinate-campanulate*, efarinose or barely farinose, somewhat *gibbous at base*, in maturity 5–6 mm. long, cleft one-half its length into lance-ovate acute to obtuse segments: *corolla* lilac; the tube equaling the calyx or slightly exserted; the *limb* 1.2–2 cm. broad, its *deeply obcordate lobes* 5–8 mm. broad: *stigma* or tops of anthers protruding from the throat of the wilted corolla: *capsule* cylindrical, only

slightly exserted: seeds less than 0.5 mm. long, smoothish.—Mém. Fam. Prim.,—Mém. Soc. Phys. d'Hist. Nat. Genève, x. t. ii. fig. 2 (1844) and in DC. Prodr. viii. 43 (1844); Ledeb. Fl. Ross. iii. 15 (1847-49); Pax & Knuth in Engler, Pflanzenr. iv²³⁷. 81 (1905), excl. var. *parvifolia*; Ostenfeld, Vidensk. Selsk. Skrift, i. Math.-Naturv. Kl. no. 8: 60 (1910); J. M. Macoun & Holm. Rep. Can. Arct. Exped. 1913-18, v. pt. A, 18A, t. xi. fig. 4 (1921); E. Busch, Fl. Sib. et Orient. Extr. iv. Cem. 65: 31 (1926). *P. mistassinica* Cham. & Schlecht. Linnaea, i. 213-215 (1826), in part; and other authors on the flora of Bering Sea region; not Michx. (1803). *P. sibirica*, var. *borealis* (Duby) Kurtz, Engl. Bot. Jahrb. xix. 397, 468 (1894). *P. borealis*, var. *Loczii* Pax in Engler & Prantl, Pflanzenr. iv²³⁷. 81 (1905), not *P. Loczyi* Kanitz (1891).—Arctic Mackenzie and Yukon, arctic and western Alaska and adjacent Siberia. The following American specimens have been examined: MACKENZIE: Warren Point, *Stringer*, no. 62,251 (Can.); Cape Bathurst, *Frits Johansen*, no. 533; Pillage Point, Arctic coast, July 19, 1924, *W. H. B. Hoare* (Can.); mouth of Moose River, Mackenzie Delta, July 18, 1924, *Hoare* (Can.). YUKON: Herschell Island, *Stringer*, no. 14,423 (Can.), *Frits Johansen*, no. 265 (Can.). ALASKA: Collinson Point, Camden Bay, *Frits Johansen*, nos. 50, 119, 119a (Can.); west of Konganovik, Camden Bay, *Frits Johansen*, no. 56; Point Hope, 1884, *Cruise of the Corwin*; Kotzebue Sound, *Fischer, Mertens*; Schismaroff Inlet, *Chamisso*, as *P. mistassinica*; Koyuk River, collector unknown; St. Michaels, Norton Sound, *Bannister* on Western Union Extens. Telegr. Expl. Exped. 1865-66, as *P. stricta*; St. Michaels, 1881, *J. Muir. Simmons*, Phytogeogr. Arct. Am. Archipel. 119 (1913) cites specimens from BANKS LAND.

Primula borealis is a variable species, but not so variable as one would infer from various published accounts of it. From its immediate allies it is distinguished, when in good condition, by the unusually large corolla with very deeply obcordate and broad lobes. From the first it has been often misinterpreted as small-flowered. Duby described it as growing "in Americae occidentali-borealis sinibus Schischmar[e]ff et Sancti Laurentii (Cham.! Bunge!)" and his illustration showed corollas barely 1 cm. broad but with the very characteristic deep notching of the lobes. The material of Chamisso's plant from "Sinus Schischmareff" in the Gray Herbarium has the flowers badly shrunken and shriveled so that they give no adequate impression of the size of the fully expanded corolla. Mertens's material, originally labeled as coming from "Sinus St. Laurentii," but changed in pen to "Sinus Kotzebue," also has badly shriveled flowers as does further material from Kotzebue Sound collected by Fischer. I have not seen the Bunge material from "Sancti Laurentii" (whether from

St. Lawrence Island, Alaska, or from St. Lawrence Bay, Siberia is not clear); but it is evident that these old collections which were available to Duby and his immediate successors failed to display the large corolla which is seen on some of the more modern specimens. Consequently we find Gray, in the *Synoptical Flora of North America*, describing *P. borealis* with "lobes of the purple corolla oblong, barely 2 lines long, deeply notched" and reducing to it *P. egaliksensis*, which has the smallest flowers of any American species, instead of the largest flowers. The specimens in the Gray Herbarium studied by Gray show that he had only poorly prepared material of *P. borealis* and that he confused with it both the typical white-flowered *P. egaliksensis* and its violet-flowered form. Similarly, Mrs. Busch, working with the collections at Leningrad, describes the corolla "lobis 3-5 mm. lg., loco latissimo 3-5 mm. lt."; but Pax & Knuth, more accurately say "limbus 12-14 mm diametens." The fully expanded flowers of well-prepared specimens before me are 1.2-2 cm. broad and I have seen no well-pressed flowers with corolla-lobes less than 5 mm. broad at summit, while in the largest specimens they are 8 mm. broad.

The largest extreme of *P. borealis*, with leaves from 1-4 cm. long, has been identified by Pax with *P. Loczyi* Kanitz; and making up his *P. borealis*, var. *Loczii* of a collection from Bering Strait and the plant described by Kanitz, he gets the extraordinary range, "Alaska: St. Lorenz . . . Kansu: am Chaji-san . . ." Kansu, in high central Asia would hardly be expected to share a species or variety in so technical a group as *Primula* with the shores of Bering Strait, fully 5500 km. to the northeast; and a glance at the description and the detailed illustration of *P. Loczyi*¹ at once shows that they are not closely related. To be sure, Kanitz spoke of his species as "Ex affinitate *P. borealis* Duby." *P. borealis*, however, has the leaves long-petioled, with the 1-7 pairs of teeth confined to the upper half of the rhombic blade, *P. Loczyi* has the cuneate-obovate leaves scarcely petioled and dentate nearly to base; the involucral bracts of *P. borealis* are lance-subulate and gibbous at base; in *P. Loczyi* linear, flat and tapering at base (consequently not of § *Farinosae*); the calyx of *P. borealis* is gibbous at base and cleft to the middle, the

¹ Kanitz Ágost, A Növénytani Gyűjtések Eredményei Gróf Széchenyi Béla Keletázsiai Utjából (1877-1880),—Plantarum in Expeditione Speculatoria Comitis Béla Széchenyi a Ludovico de Lóczy in Asia Centrali Collectarum Enumeratio, 36, t. III. i (1891); Scechenyi Ostasiat. Reise (Bot.) ii. 713, t. 3, figs. 1-2 (1898).

calyx of *P. Loczyi* non-gibbous and cleft about one-third its length; the anthers of the short-styled form of *P. borealis* are inserted at and slightly protrude from the throat; in *P. Loczyi* they are borne about midway on the corolla-tube. That *P. Loczyi* is neither a variety of *P. borealis* nor closely related to that species should be apparent.

11. *P. EGALIKSENSIS* Wormskj. *Leaves thin, efarinose, ovate, oblong, obovate or spatulate, entire or obscurely undulate (very rarely obscurely dentate), slender-petioled, 0.5–5 cm. long, 0.2–1.5 cm. wide, the petiole often equaling to exceeding the blade: scapes strict, efarinose, pale-green, 0.1–2.4 dm. high, 0.5–2.3 mm. in diameter at summit: involucral bracts green, lanceolate or lance-oblong to lance-subulate, flat to involute, dilated and gibbous-saccate at base, 2.5–7 mm. long: umbel 1–9-flowered: pedicels strict, in anthesis from about equaling to thrice the length of the bracts; in fruit becoming very unequal, the longest 0.5–5 cm. long (in exceptional individuals bearing secondary umbels): calyx pale-green, cylindric to slenderly campanulate, often gibbous at base, 3.5–6 mm. long, cleft one-fourth to one-third its length into oblong to deltoid round-tipped to acutish glandular-ciliate lobes: the yellowish corolla-tube slightly exserted; the white limb 5–9 mm. broad; the cuneate lobes distinctly shorter than the tube, 1.6–4 mm. broad, cleft one-third to one-half their length: anthers borne well below the yellow throat: style shorter than or but slightly overtopping the anthers: mature capsule stramineous, slender-cylindric, tapering at summit, becoming two to three times as long as the calyx, 7–13 mm. long, 1.8–2.1 mm. in diameter: seeds pale-brown to stramineous, smooth, 0.5–0.6 mm. long.*—Wormskj. in Hornem. Fl. Dan. ix. fasc. xxvi. 2, t. mdxi. (1816); Lange, Consp. Fl. Groenl. 71 (1880), 260 (1887); Fernald, RHODORA, xxviii. 54, 60, 75, 118, 224 (1926). *P. egallicensis* Lehm. Monogr. Prim. 64, t. vii. (1817); Pax, Engler's Bot. Jahrb. x. 198 (1889); Pax & Knuth in Engler & Prant!, Pflanzenr. iv²³⁷. 77 (1905). *P. sibirica* Hook. Fl. Bor.-Am. ii. 121 (1838), in part; J. M. Macoun & Holm, Rep. Can. Arct. Exped. v. Pt. A. 18A, t. xi. fig. 5 (1921); not Jacq. (1778). *P. sibirica*, γ *minor* Duby in DC. Prodr. viii. 43 (1844), as to Greenland plant. *P. borealis* Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878), in part, not Duby (1844).—Southern Greenland and Labrador to Alaska, south to northern Newfoundland, eastern Quebec, shores of James Bay, Alberta and British Columbia.—GREENLAND: Igaliko (type-locality), July 27, 1888, *Rosenvinge*, August 6, 1925, *A. E. & M. P. Porsild*. LABRADOR: Battle Harbor, *Bowdoin College Exped.* 1891, no. 103; *Waghorne*, no. 15,849 (Can.); damp mossy rocks, Battle Harbor, August, 1911, *C. S. Williamson* (Penn.). NEWFOUNDLAND: mossy brooksides and damp turfy slopes, Sacred Island, *Fernald & Long*, no. 28,899; mossy and turfy trap cliffs and talus, Anse aux Sauvages, *Fernald, Wiegand & Long*, no. 28,900; boggy tundra, Schooner (or Brandy) Island, *Pease & Long*, no. 28,903; moist turfy or peaty depressions in limestone barren, Cook Point, *Fernald*

& Gilbert, no. 28,894; springy swales and turfy shores, Boat Harbor, Fernald, Wiegand & Long, no. 28,895; swale near mouth of brook, Watts Bight, Pease, Griscom, Gilbert & Hotchkiss, no. 28,897; gravelly barren east of Big Brook, Pease, Griscom, Gilbert & Hotchkiss, no. 28,896; wet limestone barrens on the Highlands northeast of Big Brook, Fernald, Wiegand & Hotchkiss, no. 28,902; peaty and turfy limestone barrens west of Big Brook, Long & Gilbert, no. 28,893; bog, Flower Cove, July 12, 1920, M. E. Priest, September 2, 1923, A. G. Huntsman; swales and wet peaty limestone barrens, Capstan Point, Flower Cove, Fernald, Long & Dunbar, no. 26,960; springy swale south of the Hospital, Flower Cove, Fernald, Long & Dunbar, no. 26,961; limy swale bordering the Rock Marsh, Flower Cove, Fernald, Griscom & Gilbert, no. 28,892; springy peat on limestone gravel near the sea, St. Barbe, Fernald, Long & Dunbar, no. 26,962; borders of pools and rills in limestone barrens, St. John Island, Fernald, Wiegand, Long, Gilbert & Hotchkiss, no. 28,898. QUEBEC: Ungava Bay, 1884, L. M. Turner; along Noyava River, near Fort Chimo, Spreadborough, no. 14,420 (Can.); gravelly patch at head of rocky shore, Middle St. Mary Island, July 22 and 23, 1927, H. F. Lewis (Can.); mossy bank, island off Pointe au Maurier, Charnay, St. John, no. 90,677 (Can.); sur les plages calcaires, Pointe-aux-Ammonites, Mingan, Victorin & Rolland, no. 18,418; sur les plages calcaires, Ile à la Vache Marine, Mingan, Victorin & Rolland, no. 18,419; sur les corniches calcaires, Ile Tête à la Baleine, Mingan, Victorin & Rolland, no. 21,830; sur le calcaire sourceux, Ile Saint-Charles, Mingan, Victorin & Rolland, no. 25,109; Richmond Gulf, Spreadborough, no. 34,449 (Can.), as *P. stricta*; north of Cape Jones, Hudson Bay, Low, no. 63,243 (Can.), as *P. stricta* altered to *P. sibirica*; damp banks, Charlton Island, James Bay, J. M. Macoun, no. 15,847, as *P. mistassinica*. ONTARIO: mouth of Ekwan River, James Bay, Dowling, no. 34,525 (Can.), as *P. stricta*, changed to *P. sibirica*. MANITOBA: Churchill, J. M. Macoun, no. 79,390, as *P. sibirica*. MACKENZIE: Bernard Harbor, Frits Johansen, no. 369 (Can.), as *P. sibirica*; west shore of Great Bear Lake, J. M. Bell, no. 22,955 (Can.), as *P. sibirica*. YUKON: moist river-banks, near mouth of Lewes River, Gorman, no. 1052 in part (Can.), mixed with *P. stricta*. ALASKA: wet meadows, Yakutat, E. P. Walker, no. 1052; Chignik Bay, Alaska Peninsula, June 19, 1874, Baker.

Forma **violacea**, nom. nov. Whole plant darker: scapes and pedicels suffused with violet or purple-black: bracts and calices purple-tinged or spotted, often blackish: corolla violet or deep-lilac.—*P. sibirica* Hook. Fl. Bor.-Am. ii. 121 (1838), in part, not Jacq. (1778). *P. borealis* Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878), in part, not Duby (1844). *P. stricta*, var. *groenlandica* Warming, Svensk. Vet. Akad. Handl. xii. Afd. iii. no. 2: 21, fig. 7, A-D (1887); Lange, Conspect. Fl. Groenl. 260 (1887). *P. farinosa*, var. *groenlandica* (Warming) Pax, in Engler, Pflanzenr. iv²³⁷. 84 (1905), in small part

only, but as to name-bringing synonym. *P. sibirica*, var. *arctica* Fernald, RHODORA, xxviii. 98, 99, 105, 224 (1926), not Pax (1905). *P. farinosa*, subsp. *P. groenlandica* (Warming) W. W. Smith & Forrest, Notes Roy. Bot. Gard. Edinb. xv. no. lxxvi. 24 (1928). *P. groenlandica* (Warm.) W. W. Smith & Forrest, l. c. 49 (1928).—Throughout the range of the species, and sometimes more abundant. GREENLAND: Itivnek, Holsteinsborg Distr., July 13, 1884, *Warming & Holm*, (duplicate TYPE of *P. stricta*, var. *groenlandica*); mixed with typical *P. egaliksensis*, Igaliko, August 6, 1925, *A. E. & M. P. Porsild*. NEWFOUNDLAND: wet hollows in limestone gravel-barrens, Cook Point, *Fernald & Gilbert*, no. 28,917, *Fernald, Gilbert & Hotchkiss*, no. 28,919; wet bank on limestone barrens, Cape Norman, *Wiegand, Griscom, Gilbert & Hotchkiss*, no. 28,918; swale near mouth of brook, Watts Bight, *Pease, Griscom, Gilbert & Hotchkiss*, no. 28,901; peaty limestone barrens back of Big Brook, *Fernald & Long*, no. 28,915; sandy and gravelly margin of Big Brook, *Fernald, Wiegand, Long & Gilbert*, no. 28,916. QUEBEC: River Kovik, Hudson Straits, *Low*, no. 23,026 (Can.); Little Whale River, *Low*, no. 63,245 (Can.). ALBERTA: North Fork of the Saskatchewan, 6 miles above North Branch, *S. Brown*, no. 1024; Upper Maligne Valley, *S. Brown*, no. 1145; Maligne Lake, *S. Brown*, no. 1184; all as *P. borealis*; damp places, Kicking Horse Pass, *Dawson*, no. 15,826 (Can.). BRITISH COLUMBIA: shore of Atlin Lake, *Guilliam*, no. 101,403 (Can.). ALASKA: swamps, Popoff Island, Shumagin Islands, June 28, 1872, *M. W. Harrington*.

The name forma *violacea* is here used for *P. stricta*, var. *groenlandica* Warming (discussed in detail under *P. stricta*, p. 67). Forma *violacea* is most probably the true philogenetic color-form of *P. egaliksensis*, the white-flowered plant, originally described, being a presumable albino, such as we get in the normally lilac-flowered *P. mistassinica*; and, treated as a mere color-form, the name forma *violacea* is more appropriate to it than would be the name originally given by Warming. The plant, changing its rank from variety to forma, does not necessarily have to retain an inappropriate name.

W. W. Smith & Forest, in their *Sections of the Genus Primula* (Notes Roy. Bot. Gard. Edinb. xvi. no. lxxvi. 24), which comes to hand while this is going through the press, treat *P. egaliksensis* (using the later and incorrect spelling *P. egallicensis*) as a species but under *P. farinosa* enumerate among the subspecies (listed as binomials in violation of general botanical usage and of the International Rules of Botanical Nomenclature) a "*P. groenlandica*, Warming." In the index, however, they definitely give "*P. groenlandica*" as a "Species." Warming, of course, had no such species, nor did he have a subspecies of *P. farinosa*. He published *P. stricta*

var. *groenlandica*, and, as the specimens show, his plant was a violet-flowered *P. egaliksensis*.

P. egaliksensis has many times been confused with *P. sibirica*, to which it is more closely allied than to other species. Like *P. sibirica* it has long-petioled, mostly entire, thin and dilated leaves, broad and often flat involucrel bracts, copiously glandular-ciliate calyx-lobes, deeply notched corolla-lobes, and very slender capsules; but in *P. sibirica* the involucrel bracts are usually longer and more dilated upward (often slightly obovate) and they have more prolonged and narrower auricles; the calyx is longer (5–8 mm. long); the corolla is much larger (1–1.8 cm. broad) and with broader lobes; and the summits of the stamens or (in the long-styled form) the stigma slightly protrude from the throat. *P. sibirica* is a plant of arctic and alpine Eurasia, reaching America only in the high mountains of Alaska and Yukon; *P. egaliksensis* is strictly American, occurring mostly between latitudes 50° and 60° N., though sometimes reaching the Arctic Coast, and found only slightly north of 60° in southern Greenland.

12. *P. SIBIRICA* Jacq. *Leaves green, efarinose, slender-petioled, 1–7 cm. long; the thin blade suborbicular, ovate or elliptic, rounded at summit, entire, or obsoletely dentate, abruptly contracted at base, shorter than to equaling the petiole, 0.5–2 cm. broad: scape slender, 0.45–1.5 dm. (–3.8 dm. acc. to Busch) high, efarinose: involucrel bracts oblong or narrowly obovate, 4–11 mm. long, obtuse or abruptly contracted at tip, often prolonged at base into narrow saccate auricles 1–1.5 mm. long: umbel 1–4 (–8)-flowered: pedicels filiform, 0.7–4 cm. long: calyx efarinose, slenderly campanulate, in maturity 5–8 mm. long, cleft one-third its length into oblong-ovate fulvous-ciliolate lobes: corolla-tube more or less exserted, very slender; the lilac limb 1–1.8 cm. broad, with obcordate or deeply emarginate broadly cuneate or obovate lobes: stigma or summits of anthers slightly exserted from the throat: capsule slenderly cylindrical, somewhat narrowed at summit, from slightly exserted to twice the length of the calyx, about 1.5 mm. in diameter: seeds not seen.—Misc. Austr. i. 161 (1778); Lehm. Monogr. Prim. 60, t. 5 (1817); Hook. Bot. Mag. lix. t. 3167 (1832) and lxii. t. 3445 (1835); Duby in DC. Prodr. viii. 43 (1844); Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878), in small part only; Pax in Engler's Bot. Jahrb. x. 197 (1889); Pax & Knuth in Engler, Pflanzenr. iv²³⁷. 76, 77, incl. vars. (1905); E. Busch, Fl. Sib. et Orient. Extr. iv. Cem. 65: 61 (1926). *P. finmarchica* Jacq. Misc. Austr. i. 160 (1778). *P. norvegica* Retz. Fl. Scand. Prodr. ed. 2: 55 (1795). *P. intermedia* Ledeb. Mém. Acad. Pétersb. v. 519 (1815). For further synonymy see Pax & Knuth, l. c. and E. Busch, l. c.—Arctic Europe, Ural*

Mountains, arctic and central Asia; Alaska and Yukon. ALASKA: Kuskokwim Valley, 1884, *Weinmann*; cited by Pax & Knuth from Lynn Canal. YUKON: Lake Tahko, near head of Yukon River, June 24, 1883, *Schwatka*, no. 81.

The citation by Hooker, *Fl. Bor.-Am.* ii. 121 (1838) of *P. sibirica* from "Barren country between lat. 60° and 69°, . . . *Dr Richardson*" can hardly be accepted as unquestionably belonging here. Hooker said "I have carefully compared *Dr. Richardson's* specimen with authentic ones of the European *P. Norvegica*, the Asiatic *P. Sibirica*, and the *P. Egaliccensis* from Hornemann himself, and there can be no question about the propriety of referring them all to one and the same species." *P. egaliksensis*, however, is now known to be quite distinct from *P. sibirica* and specimens before me show it from several stations between the west shore of Hudson Bay (Churchill, lat. 58° 51') and Alaska. It is most probable, then, that Hooker's *P. sibirica* was *P. egaliksensis*; for both the white- and purple- or violet-flowered plants of the latter have been repeatedly misidentified as *P. sibirica*. The identity of the violet-flowered *P. egaliksensis* is discussed in the comments upon *P. stricta*, var. *groenlandica* Warm. on p. 67.

The citations "*Pr. integrifolia* Oeder in *Fl. Danica* t. 188 (1767)" and "*Pr. rotundifolia* Pallas, *Reise Prov. russ. Reiches* III. (1776) 223" are given by Pax & Knuth in the synonymy; and the first is made the basis of the varietal combination, *P. sibirica*, "Var. β . *integrifolia* (Oeder) Pax." Both these names would, thus, appear to have been published earlier than *P. sibirica*, but examination of the original publications at once shows that they cannot be taken up to displace it.

Oeder did not publish the binomial *P. integrifolia*. Accompanying a recognizable plate of *P. sibirica* was the text:

"TAB. CLXXXVIII.

Auricula ursi IV. Clus. pann. 349. . . .

Primula foliis carnosis glabris integerrimis. Hall. Helv. 485.

Primula, integrifolia, foliis integerrimis glabris oblongis, calycibus tubulosis obtusis. Linn. Sp. pl. 205. . . .

Locus. In Finmarkia, . . ."

Only by the Roman type of "*integrifolia*" did Oeder distinguish that single word of a polynomial derived from the Linnean diagnosis of *P. integrifolia* L. Sp. Pl. i. 144 (1753), a species of southern Europe wholly distinct from *P. sibirica*. Oeder misidentified the Finmark

plant with *P. integrifolia* L. and certainly was not proposing a new species. Incidentally his "*Primula, integrifolia, foliis integerrimis*" was the third of a series of names and would technically be "published in synonymy"; and, furthermore, it is not clear that Oeder was at that time following binomial nomenclature. The emphasis by typography on certain adjectives was not uniformly confined to a single "specific" name. Thus, in the same fascicle we find "*Campanula alpina linifolia caerulea* C. B. Prodr. 34" with the synonym "*Campanulae, rotundifoliae, varietas*. Linn. Sp. pl. 232" (Tab. clxxxix); "*Arthritica hiberna*. Gesn." . . . with the synonym "*Primula, veris, acaulis, foliis dentatis rugosis*" (Tab. cxci) and "*Medica echinata minima*. J. B. . . ." with the synonym "*Medicago polymorpha minima*. Linn. Sp. pl." (Tab. ccxi); while in some cases (Tabs. ccxiv, ccxxxii, ccxxxiii) no roman type was used. It is, therefore, very clear that Oeder had in these early fascicles of *Flora Danica* no clear-cut intention to use binomials exclusively and such as crept in in synonymy were merely "accidental" binomials. At any rate, the name *Primula integrifolia*, already validly used by Linnaeus for another species could not be used for a later species and it is unfortunate that in making Oeder's misidentification of *Primula integrifolia* L. the basis of a variety of *P. sibirica* Pax should have excluded perfectly valid varietal combinations. The first unequivocal varietal name for var. *integrifolia* Pax (1905) seems to be var. *kashmiriana* Hook. f. Bot. Mag. cvi. t. 6493 (1880).

The name *Primula rotundifolia* Pallas has no nomenclatorial status. It was used casually and without diagnosis in the running text of his *Reise*; and combinations based upon it should be excluded: such a name as *P. sibirica*, var. *rotundifolia* (Pall.) Pax in Engler's Bot. Jahrb. x. 197 (1889).

IDENTITIES OF NUMBERED EXSICCATAE CITED

| | |
|---|--|
| 1, <i>P. stricta</i> | 8, <i>P. mistassinica</i> |
| 2, <i>P. laurentiana</i> | 8a, " forma <i>leucantha</i> |
| 2a, <i>P.</i> " forma <i>chlorophylla</i> | 8b, <i>P.</i> " var. <i>noveboracensis</i> |
| 3, <i>P. incana</i> | 9, <i>P. parvifolia</i> |
| 4, <i>P. decipiens</i> | 10, <i>P. borealis</i> |
| 5, <i>P. specuicola</i> | 11, <i>P. egaliksensis</i> |
| 6, <i>P. intercedens</i> | 11a, <i>P.</i> " forma <i>violacea</i> |
| 7, <i>P. ajanensis</i> | 12, <i>P. sibirica</i> |

ARCHIBALD, O. L., no. 69,371 (8).

BAILEY, L. H., no. 477 (6).

BAKER, no. 361 (3).

BELL, J. M., no. 22,955 (11); 22,956 (8).

- BELL, ROBERT, no. 15,829 (1).
 BISSELL, BEAN, WHITE & LINDER, no. 22,234 (2).
 BLAISDELL, no. 129 (9).
 BLANKINSHIP, no. 727 (3).
 BOWDOIN COLLEGE EXPED., no. 103 (11); 104 (2).
 BROWN, S., no. 13 (8); 900 (8); 919 (8); 1024 (11a); 1107 (1); 1145 (11a); 1184 (11a).
 BUTTERS & ROSENDAHL, nos. 1327 and 1434 (8).
 CAIRNES, C. E., no. 89,722 (1).
 CHAMBERLAIN, no. 298 (8).
 COLLINS, FERNALD & PEASE, nos. 5319, 5320, 5434, 5435, 5554 (2).
 COOPER, no. 55 (8).
 COX & O'NEILL, no. 581 (1).
 CUSHMAN & SANFORD, no. 1515 (2).
 DAWSON, no. 15,826 (11a); 15,844 (8).
 DODGE, C. K., no. 3 (6).
 DOWLING, no. 34, 525 (11); 34,526 (1).
 EAMES, A. J., no. 4804 (8b).
 EASTWOOD, no. 68 (5).
 FERNALD, nos. 82, 2427, 2428 (8).
 FERNALD, BARTRAM, LONG & FASSETT, no. 24,327 (2).
 FERNALD & COLLINS, no. 246 (2); 707 and 708 (8); 1145 (8); 1147, 1148 and 1149 (2).
 FERNALD, DODGE & SMITH, no. 25,983 (8).
 FERNALD & GILBERT, no. 28, 894 (11); 28,917 (11a).
 FERNALD, GILBERT & HOTCHKISS, no. 28,919 (11a).
 FERNALD, GRISCOM & GILBERT, no. 28,892 (11).
 FERNALD & LONG, no. 28,899 (11); 28,911 (2a); 28,912 (2); 28,915 (11a).
 FERNALD, LONG & DUNBAR, no. 26,955 (2a); 26,956 (2); 26,957 (2a); 26,958 and 26,959 (8); 26,960, 26,961 and 26,962 (11).
 FERNALD, LONG & FOGG, no. 375 (2).
 FERNALD & PEASE, nos. 25,232 and 25,233 (2).
 FERNALD & ST. JOHN, no. 10,681 (8a); 10,861 (8).
 FERNALD & WIEGAND, no. 3881 (8a); 3885-3890 (2); 6071 and 6072 (8a).
 FERNALD, WIEGAND & BARTRAM, no. 6068 (2).
 FERNALD, WIEGAND, BARTRAM & DARLINGTON, no. 6070 (8a).
 FERNALD, WIEGAND & DARLINGTON, no. 6069 (2).
 FERNALD, WIEGAND & HOTCHKISS, no. 28,902 (11).
 FERNALD, WIEGAND & LONG, no. 28,895 (11); 28,900 (11); 28,914 (2).
 FERNALD, WIEGAND, LONG & GILBERT, no. 28,916 (11a).
 FERNALD, WIEGAND, LONG, GILBERT & HOTCHKISS, no. 28,898 (11); 28,913 (2a).
 FERNALD, WIEGAND, PEASE, LONG, GRISCOM, GILBERT & HOTCHKISS, no. 28,891 (8a); 28,905 (2).
 GAETZ, H. H., no. 7476 (3).
 GORMAN, no. 1052 (1 and 11).
 GRISCOM, MACKENZIE & SMITH, no. 25,981 (2).
 GUILLIAM, no. 101,403 (11a).
 HALL & HARBOUR, no. 378 (3).
 HARRINGTON, W. H., no. 644 (2).
 HEACOCK, no. 14 (8).
 HOUSE, no. 6911 (8b).
 HOWE, C. F., no. 1019 (8).
 HUGHES, E. L., no. 45 (3).
 JOHANSEN, FRITS, no. 50 (10); 56 (10); 119 (10); 265 (10); 347 (1); 369 (1); 533 (10); 103,287 (2).
 LOW, A. P., no. 6035 (8); 23,026 (11a); 24,529 (1); 63,242 (1); 63,243 (11); 63,244 (1); 63,245 (11a).
 LONG & GILBERT, no. 28,893 (11).

- LYON, H. L., no. 924 (6).
 MACDANIELS, no. 3020 (8b).
 MACKENZIE & GRISCOM, no. 10,402 (2); 10,405 (8a).
 MACOUN, J., no. 5313 (3); 11,776 (2); 12,211 (2); 12,742 (2); 12,726 (8);
 15,830 (2); 15,833 (2); 15,837 (2); 15,838 (2); 15,841 (8); 15,842 (8);
 15,846 (6 and 8); 22,545 (8); 24,528 (3); 54,260 (6); 68,725 (8); 81,152
 (2); 88,032 (8a); 101,401 (3).
 MACOUN, J. M., no. 15,831 (1); 15,847 (11); 15,850 (1); 68,948 (8a); 68,949 (2);
 79,388 (1); 79,390 (11).
 MALTE & WATSON, no. 118,331 (3), 118,333 (8).
 MERRILL & WILCOX, nos. 749, 990 and 1039 (3).
 MOODIE, no. 942 (3).
 NELSON, nos. 1871 and 1961 (3).
 PAYSON & PAYSON, nos. 1735 and 2648 (3).
 PEASE, nos. 2248, 17,971 and 18,003 (8).
 PEASE, GRISCOM, GILBERT & HOTCHKISS, nos. 28,896 and 28,897 (11); 28,901
 (11a).
 PEASE & LONG, no. 28,903 (11); 28,907 (2).
 PEASE, LONG & GILBERT, no. 28,890 (8a).
 PEASE & SMITH, no. 25,982 (8).
 ROBINSON, RALPH, no. 102 (2).
 ROSENDAHL, no. 4238 (8).
 ROSENDAHL & BUTTERS, nos. 1327, 1434 and 4643 (8).
 SANSON, no. 22,140 (8).
 SCHWATKA, no. 81 (12).
 SCRIBNER, no. 143 (3).
 SHELDON, E. P., no. 4400 (6); 4768 (8); 4948 (8).
 SPREADBOROUGH, no. 14,420 (11); 14,421 (1); 19,852 (3); 34,449 (11); 62,554
 (1); 62,555 (1); 62,556 (8).
 STECKER, no. 78 (1).
 ST. JOHN, no. 90,674 (2); 90,675 (2); 90,676 (8); 90,677 (11).
 ST. JOHN & NICHOLS, no. 2444 (8).
 STRINGER, nos. 14,423, 62,251 (10).
 TAYLOR, ELIZABETH, no. 38 (3); 87 (1); 110 (3).
 TYRRELL, no. 15,840 (8).
 VICTORIN, nos. 131 and 4188 (2); 16,722 (8).
 VICTORIN & ROLLAND, nos. 18,418 and 18,419 (11); 18,421 (2a); 18,465 and
 18,485 (2); 21,830 (11); 21,832 (2); 25,107 (8); 25,109 (11); 25,139 (2).
 VICTORIN, ROLLAND, BRUNEL & ROUSSEAU, nos. 17,642 and 17,643 (2);
 17,645 (8).
 VICTORIN, ROLLAND & LOUIS-MARIE, no. 21,831 (8).
 WAGHORNE, no. 5 (8a); 15,849 (11).
 WALKER, E. P., no. 1052 (11).
 WETMORE, no. 103,037 (2).
 WIEGAND, GILBERT & HOTCHKISS, no. 28,908 (2a); 28,918 (11a).
 WIEGAND & HOTCHKISS, no. 28,904 (2a).
 WIEGAND & LONG, no. 28,909 (2a).

EXPLANATION OF PLATE 169.

PRIMULA LAURENTIANA $\times \frac{3}{4}$. Photograph taken by *Professor J. F. Collins*
 at the type-locality, Bic, Quebec.

PLANTS NEW TO COOS COUNTY, N. H.—On 21 July, 1927, while
 passing through a hay field northeast of Appalachia station in Ran-
 dolph, I was struck by several clumps of an unfamiliar *Potentilla*, about